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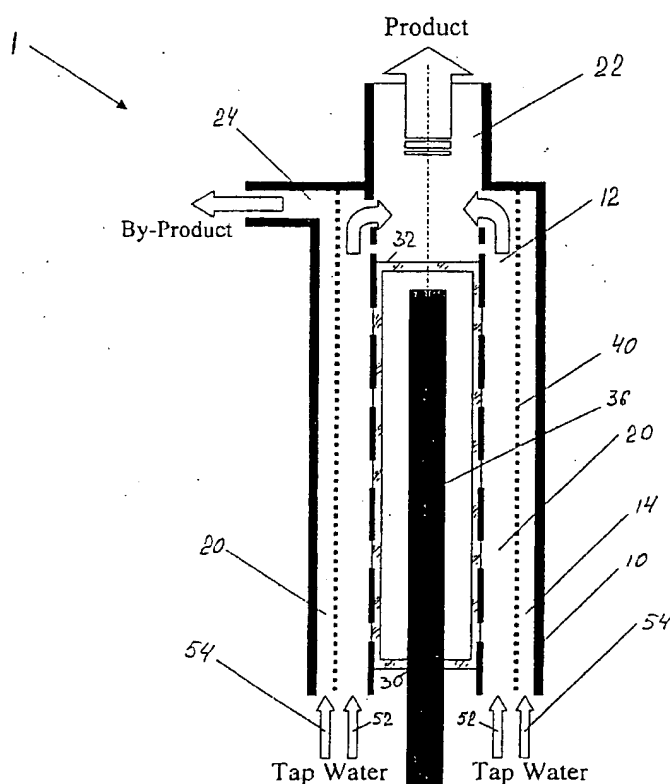
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[Continued on next page]

(54) Title: ACTIVATED WATER APPARATUS AND METHODS



(57) Abstract: An apparatus (1) subjects water to waves from an RF plasma. This allows continuous production of "activated water" characterized by cluster sizes below about 4 molecules per cluster, water having pH below 4 or above 10, or water having ORP of less than -350 mV or more than +800 mV. The basic frequency of the plasma is preferably between 0.44 MHz and 40.68 MHz, and the plasma is preferably modulated at a frequency between 10 kHz and 34 kHz. Flow rates typically range from 20 l/hr to about 2000 l/hr. Activated water can be used for many purposes, including antimicrobial cleaning of worktable, floor, wall, knife, transport and other surfaces, for example, in meat processing facilities and hospitals.

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SI, SK, SK (utility model), SL, TJ, TM, TR, TT, TZ, UA,  
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# INTERNATIONAL SEARCH REPORT

International application No.

PCT/US01/49310

## A. CLASSIFICATION OF SUBJECT MATTER

IPC(7) : B01J 19/08; H05F 3/00  
US CL : 422/186, 186.04; 204/164

According to International Patent Classification (IPC) or to both national classification and IPC

## B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)  
U.S. : C25D

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practicable, search terms used)  
Please See Continuation Sheet

## C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category *	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	US 4,954,320 A (BIRMINGHAM et al.) 04 September 1990 (04.09.1990), col. 2, line 67 to col. 3, line 2; col. 3, lines 15-25; col. 4, lines 66-68; col. 6, lines 13-16; col. 6, lines 63-66; col. 8, lines 40-45, and Fig. 4.	1-2, 6-8
Y		3-5,9
Y	US 5,965,009 A (SHIMAMUNE et al.) 12 October 1999 (12.10.1999), col. 8, lines 30-32.	13-16,18
Y	JP 11-253522 A (YAMADA, Makoto) 21 September 1999 (21.09.1999), abstracts.	13-15,17

☐ Further documents are listed in the continuation of Box C.

☐ See patent family annex.

* Special categories of cited documents:	"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention
"A" document defining the general state of the art which is not considered to be of particular relevance	"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone
"E" earlier application or patent published on or after the international filing date	"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art
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"O" document referring to an oral disclosure, use, exhibition or other means	
"P" document published prior to the international filing date but later than the priority date claimed	

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# INTERNATIONAL SEARCH REPORT

International application No.:

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Continuation of B. FIELDS SEARCHED Item 3:

WEST, STN

search terms: water, radio frequency, plasma